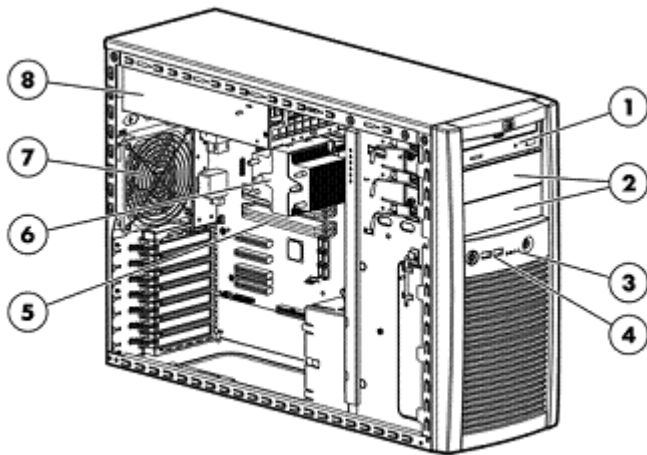


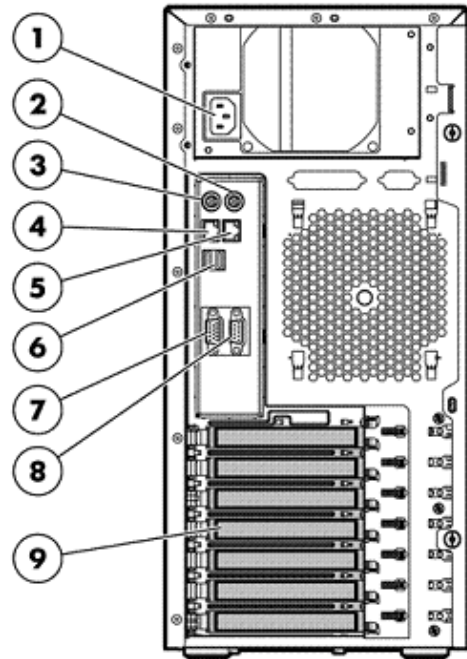
### Overview

The HP ProLiant ML310 G5p is an affordable, single processor tower server engineered to meet the needs of corporate small sites. It is designed to provide the solid network foundation essential to fuel thriving small offices. Processing power ranging from single-core Celeron to quad-core Xeon combines with industry-leading management and essential data protection features for a secure, affordable platform that helps you run your business efficiently.



#### Front View:

1. SATA DVD-ROM
2. Removable Media Bays
3. LED Indicators and Power Button
4. Upfront USB Ports
5. Four DIMM Sockets for up to 8GB DDR2 memory
6. Processor Socket (Intel® Xeon®, Core™ 2, Pentium® or Celeron®)
7. System Fan
8. 410W Non-Hot Plug Non-Redundant Power Supply or 430W Hot Plug Redundant Power Supplies



#### Rear View:

1. Power cord connections for Non-Redundant Power Supply
2. PS/2 Mouse connector
3. PS/2 Keyboard connector
4. 10/100/1000 NIC 1 Shared iLO 2
5. 10/100/1000 NIC 2
6. USB 2.0 (qty 2)
7. Video Port
8. Serial Port
9. Up to Five Expansion Slots (Four PCI Express and One PCI-X (Optional))

### Standard Features

**NOTE:** For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.

#### Processor

One of the following  
depending on Model

##### Quad-Core Processors

Quad-Core Intel® Core™2 processor Q9400 (2.66 GHz, 6MB L2 Cache, 1333MHz FSB)

Quad-Core Intel® Xeon® processor X3330 (2.66GHz, 6MB cache, 1333MHz FSB)

##### Dual-Core Processors

Dual-Core Intel® Xeon® processor E3120 (3.16GHz, 6MB cache, 1333MHz FSB)

Dual-Core Intel® Xeon® processor E3110 (3.00GHz, 6MB cache, 1333MHz FSB)

Dual-Core Intel® Core™2 duo processor E8400 (3.00 GHz, 6MB L2 Cache, 1333MHz FSB)

Dual-Core Intel® Core™2 duo processor E6400 (2.13 GHz, 2MB L2 Cache, 1066MHz FSB)

Dual-Core Intel® Pentium processor E2160 (1.8GHz, 1MB L2 Cache, 800MHz FSB)

##### Single-Core Processors

Single-Core Intel® Celeron® processor 440 (2.0GHz, 512KB L2 Cache, 800MHz FSB)

#### Cache Memory

One of the following  
depending on Model

6 MB L2 Cache

**NOTE:** For Models with Intel Xeon processor X3330, and E3120. For Models with Intel Core 2 processor Q9400, E8400.

2 MB L2 Cache

**NOTE:** For Models with the Intel Core2 processor E6400.

1 MB L2 Cache

**NOTE:** For Models with the Intel Pentium processor E2160.

512 KB L2 Cache

**NOTE:** For Models with the Intel Celeron processor 440.

#### Chipset

Intel® 3210 Chipset

**NOTE:** For more information regarding Intel® chipsets, please see the following URL:  
<http://www.intel.com/products/server/chipsets/>.

#### Memory Protection

ECC

#### Memory

One of the following  
depending on Model

Type

PC2-6400 (DDR2-800) Unbuffered Memory

Standard

1 GB (1 x 1 GB)

Maximum

8 GB

#### Network Controller

NC326i Dual Integrated Gigabit NICs



Standard Features

Expansion Slots

NOTE: Up to 5 Total: (1) PCI Express x8, (3) PCI Express x1, Optional Extender Board for (1) 64-bit/100MHz PCI-X.

Expansion Slots #	Technology	Bus Width***	Connector Width	Bus Number*	Device No.**	Form Factor	Notes
7	PCIe	x1	x8	4	0	Half length, full height slot	
6	PCIe	x1	x8	7	0	Half length, full height slot	
5	PCIe	x1	x8	10	0	Full length, full height slot	
3	PCIe	x8	x8	18	0	Full length, full height slot	
1 (Optional)	PCI-X (100MHz, 3.3V)	64-bit	Not applicable	14	2	Full length, full height slot	

\* Default bus assignment (in decimal). Inserting cards with PCI bridges may alter the actual bus assignment number

\*\* Slots are enumerated differently based on OS. MS OS's enumerate from lowest to highest Device ID by bus (starting with the lowest bus).

\*\*\* Indicates the number of physical electrical lanes running to a PCI-e connector.

Storage Controllers

The HP ProLiant ML310 G5p supports Serial ATA (SATA) and Serial Attached SCSI (SAS) hard drives. Models described as SAS models include an 8 port HBA or controller that supports both SATA and SAS hard drives in non-RAID, RAID 0, or RAID 1 configurations. Models described as SATA/SAS support SATA hard drives standard and require the installation of an HBA or controller to support SAS.

Embedded HP SC40Ge SAS HBA with RAID 0, 1

NOTE: Use of the embedded SATA RAID feature with a Linux operating system requires installation of a driver from a floppy drive. The supported floppy drive can be a USB drive key (except Windows 2003), USB floppy drive, half-height internal floppy drive, or virtual floppy via Integrated Lights-Out 2 (iLO 2).

NOTE: See the "Storage" section of these QuickSpecs for information on required to support SATA and SAS hard drive configurations.

Internal Storage Devices

Diskette Drive	Optional 1.44 MB Diskette Drive
	NOTE: Use of the embedded SATA RAID feature with a Linux operating system requires installation of a driver from a floppy drive. The supported floppy drive can be a USB drive key, USB floppy drive, half-height internal floppy drive, or virtual floppy via Integrated Lights-Out 2 (iLO 2).
Optical Drive	SATA DVD-ROM Drive Standard
Hard Drives	None Standard

### Standard Features

Maximum Internal Storage	Hot Plug SAS (3.5")	4.0TB	4 x 1TB
	Hot Plug SATA (3.5")	8.0TB	4 x 2TB

**NOTE:** See the "Storage" section of these QuickSpecs for information on controllers required to support SATA and SAS hard drive configurations.

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Interfaces	Serial	1 (Optional second serial port available)
	Parallel	1 (Optional)
	Network RJ-45 (Ethernet)	2 (1 Shared iLO 2 port)
	iLO 2 Remote Management port	1 (see Network RJ-45 port)
	Keyboard	1
	Pointing Device (Mouse)	1
	Graphics	1
	Dedicated USB Port	1 (available for USB tape connectivity)
	USB Ports	5 (2 front; 2 rear; 1 internal)
	<b>NOTE:</b> Please see the following URL for additional information regarding USB support: <a href="http://h18004.www1.hp.com/products/servers/platforms/usb-support.html">http://h18004.www1.hp.com/products/servers/platforms/usb-support.html</a> .	

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Industry Standard Compliance	ACPI V1.0b and 2.0 Compliant
	PCI 3.0 Compliant
	PCI-X 3.0 Compliant
	PCI-Express 3.0 Compliant
	PXE Support
	WOL Support
	Microsoft® Logo certifications
	Novell Logo certifications
USB 2.0 Support	

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Server Power Cords	All models ship with one 1.8m (6 foot) standard low-line power cord.
	<b>NOTE:</b> HP ProLiant ML310 a C13 to C14 2.8M jumper cord ships standard. If customers require a power cord, they can check the power cord matrix for the appropriate sku. Please see the following power cord matrix: <a href="http://www.hp.com/go/powercordmatrix">http://www.hp.com/go/powercordmatrix</a> .

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Power Supply	410 Watt PFC (Power Factor Correcting) non-hot plug non-redundant power supply or 430 Watt PFC hot plug redundant power supplies (ships with two power supplies)
	<b>NOTE:</b> To review typical system power ratings use the HP Power Advisor which is available online located at url: <a href="http://www.hp.com/go/proliant-energy-efficient">www.hp.com/go/proliant-energy-efficient</a> or <a href="http://www.hp.com/go/hppoweradvisor">www.hp.com/go/hppoweradvisor</a>

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### Standard Features

System Fans	1 - Non-hot plug, Non-redundant system fans; 1 optional fan for PCI-X Extender Board <b>NOTE:</b> Does not include fan in power supply.	
Required Cabling	For required cabling information, refer to the HP Web site at: <a href="http://www.hp.com/servers/ml310-g5p">www.hp.com/servers/ml310-g5p</a> .	
Operating Systems and Virtualization Software Support for ProLiant Servers	<a href="#">Microsoft Windows Server</a> <a href="#">Microsoft Windows Server Hyper V</a> <a href="#">Red Hat Enterprise Linux (RHEL)</a> <a href="#">SUSE Linux Enterprise Server (SLES)</a> <a href="#">Oracle Enterprise Linux (OEL)</a> <b>NOTE:</b> For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server including how to purchase from HP, please visit our OS Support Site at: <a href="http://www.hp.com/go/ossupport">http://www.hp.com/go/ossupport</a> and our driver download page <a href="http://www.hp.com/support/ML310G5p">www.hp.com/support/ML310G5p</a> .	
Graphics	Integrated ATI ES1000, 32 MB video standard <ul style="list-style-type: none"><li>• 16 bit color: maximum resolution of 1600 x 1200</li><li>• 32 bit color: maximum resolution of 1280 x 1024</li></ul> <b>NOTE:</b> Maximum resolution available via iLO 2 remote console is 1280 x 1024.	
Form Factor	Tower (5U) Optional Tower-to-Rack Enabling Kit available (system & tray occupy 6U)	
HP Insight management software	HP Foundation Pack	<p>Managing the growing number of servers can be complex and expensive for your organization. IT managers need to address changing business needs with tools that meet the challenges of managing today's complex Datacenters.</p> <p>HP provides management solutions that are designed to simplify a server's installation, configuration and maintenance throughout the entire server lifecycle. This provides the customer with higher levels of operational efficiency and highly reliable systems: <a href="http://www.hp.com/go/foundation">www.hp.com/go/foundation</a>.</p> <p>The foundation pack includes:</p> <ul style="list-style-type: none"><li>• HP SmartStart</li><li>• HP Management DVD</li><li>• HP ProLiant Smart Update Firmware DVD</li></ul> <p>SmartStart version supported (minimum): SmartStart 7.51 <a href="http://www.hp.com/servers/smartstart">http://www.hp.com/servers/smartstart</a></p> <p><b>NOTE:</b> In an effort to support reducing our environmental impact, the HP Insight Foundation Suite for ProLiant media will be available as a selectable option for this server at time of order of a CTO SKU. This will allow</p>



### Standard Features

	customers to order the number of media kits that best meet their needs and eliminate receiving unnecessary duplicate media.
HP Integrated Lights-Out (iLO)	HP Integrated Lights-Out (iLO) simplifies server setup, health monitoring, power and thermal control, and lights-out remote administration of ProLiant ML, DL, and BL servers. HP iLO functions without additional software and can be accessed from any location via a web browser. HP iLO works hand-in-hand with HP Systems Insight Manager, Insight Control, and Insight Dynamics for ProLiant, helping customers unleash the value of the ProLiant platform and deliver the highest possible quality of IT service. For more information, visit: <a href="http://www.hp.com/go/iLO">www.hp.com/go/iLO</a>

Intelligent Manageability	HP Systems Insight Manager Online ROM Flash Utility Drive Parameter Tracking (with Smart Array Controller) Dynamic Sector Repairing (with Smart Array Controller) Pre-Failure Warranty (covers processors, memory and SAS hard drives) BIOS Serial Console
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Security	Power-on password Setup password Diskette boot control Power switch security
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Warranty	<p>This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Hardware diagnostic support and repair is available for one year, with 1 year Next Business Day and year on-site support from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Expanded support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details</p> <p><b>NOTE:</b> Server Warranty includes 1-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have HP replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at: <a href="http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html">http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html</a></p>
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### Optional Features

#### HP Insight management software    HP Insight Control

HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console.

Two versions of Insight Control are available, to serve environments requiring either a Linux-based or a Windows-based central management server: HP Insight Control for Linux, and HP Insight Control. See [www.hp.com/go/insightcontrol](http://www.hp.com/go/insightcontrol)

HP Insight Control includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, please visit: <http://www.hp.com/services/insight>.

#### HP Insight Dynamics for ProLiant

HP Insight Dynamics for ProLiant, a product option, is an integrated command center that enables IT Staff personnel to continuously analyze and optimize a converged infrastructure, while automating and reducing the cost of common data center tasks by as much as 40 percent. As a powerfully integrated by design toolkit to accelerate complex technology projects and simplify daily operations that ultimately enable IT Staff personnel to dynamically keep pace with the organizations changing business requirements. It enables them to plan capacity and power continuously, balance across physical and virtual resources, and ensure cost-effective high availability. It also enables IT organizations to provision infrastructure consistently and automatically from pools of shared resources using a self-service portal. Resources provisioned can range from a single virtual machine to complex multi-tier environments and their associated physical and virtual resource requirements. In addition to the previous functional benefits, it also provides a cost-effective disaster recovery for physical and virtual environments that works with HP StorageWorks Continuous Access software for both the Enterprise Virtual Array and the XP storage array allowing application environments to be reactivated in minutes with the touch of a button to a remote location.

**NOTE:** For more information, visit:  
<http://www.hp.com/go/insightdynamics>

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#### Rack and Rack Options    Rack Cabinets:

- For information regarding Rack Cabinets, please see the following URL:  
<http://www.hp.com/go/rackandpower>

#### KVM Switches, Serial Console Servers, Rackmount Monitors, Keyboards:

- For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: <http://www.hp.com/go/kvm>.



### Optional Features

#### Factory Express Portfolio for Servers and Storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSAxxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches.

For more information on Factory Express services for your specific server model please contact your sales representative or go to: <http://www.hp.com/go/factory-express>.

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#### HP Enterprise Configurator

The HP eConfigure-Enterprise Configurator now provides factory default racking for our HP hardware portfolio. This approach is aligned with our strategic direction to meet the needs and expectations of our valued customers. If you require "custom" rack configuration, please contact HP's Customer Business Center or an Authorized Partner for assistance. <http://www.hp.com/products/configurator>.





### Service and Support

#### Service and Support

##### **HP Care Pack Services: Packaged server and storage services for increased uptime, productivity and ROI**

When you buy HP server and storage products and solutions, it's also a good time to think about what levels of support you may need. Our portfolio of service options reduce deployment and management worries while helping you get the most out of your server and storage investments. We take a holistic approach to your environment, bridging servers, blades, storage, software and network infrastructures with our packaged HP Care Pack Services for servers and storage.

##### **Protect your business beyond warranty**

When it comes to robustness and reliability, standard computing equipment warranties have matured along with technology. Good news that can also create problems stemming from depending on standard warranties designed to only protect against product defects and some downtime causes. Using a standard approach to warranty uplifts, such as HP Care Pack Services, helps reduce downtime risks and provides operational consistency for mission-critical and standard business computing.

##### **HP Care Pack Services: Upgrading or extending standard server and storage warranties cost effectively**

HP Care Pack Services offer a standard reactive hardware and software support services suite sold separately, or combined with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of integrated proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition with HP Proactive Select, you can acquire the specific proactive constancy and technical services. HP Proactive Select menu offers a broad set of service options that you can mix and match depending on your specific requirements. Proactive service options include offers for server, storage, network, SAN device, software, environment and education services.

HP server and storage lifecycle support services offers a full spectrum of customer care-from technology support to complex migrations to complete managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education Services offer flexible, comprehensive training on to help your IT staff get the most out of your server and storage investments. HP Financial solutions extend innovative financing and cost-effective asset management programs-from purchase to equipment retirement.

Learn more: [www.hp.com/services/servers](http://www.hp.com/services/servers) and [www.hp.com/services/storage](http://www.hp.com/services/storage)

**NOTE:** Care Pack Services availability may vary by product and country.

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at <http://www.hp.com/go/lookuptool>



### Service and Support

#### Recommended HP Care Pack Services for optimal satisfaction with your HP product

**Recommended Services**    **3-Year HP Hardware Support Onsite Call-to-Repair (CTR) Service, 6- or 24-hour**  
Provides your IT manager with a team of support specialists who will quickly begin troubleshooting the system to help return the hardware to operating condition within 6 or 24 hours of the initial service request to the HP Global Solution Center.

HP is committed to repairing your hardware within a maximum of six or twenty four hours. The benefits include:

- Improved system uptime
- Predictable repair times
- More effective IT resource planning
- Consistent level of hardware support across your multi-technology systems

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6636ENN>

#### **3-Year HP Hardware Support Onsite Service, 4-hour response, 24x7**

Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged.

This service provides a trained HP service specialist to perform an installation that meets HP quality standards, for:

- Help improve or maintain system uptime
- Convenient onsite support
- Committed response time

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE>

#### **HP ProLiant Server Hardware Installation**

Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

- Expedited installation, with all service prerequisites met before the installation is performed
- Installation in accordance with manufacturer's specifications, enhancing the supportability of your HP-installed hardware and software
- Service delivery at a mutually scheduled time
- Allows your IT resources to stay focused on their core tasks and priorities
- Availability of an HP service specialist to answer questions during the onsite delivery of this service

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN>



### Service and Support

#### Optional HP Care Pack Services that will enhance your HP product experience

##### Optional Services

##### 3-Year HP Support Plus 24

As an alternative to our recommended support level, for customers who need access to responsive 24x7 hardware and software support plus software updates on HP and selected third party products:

For a higher return on your server and storage technology, our 3-year combined reactive support service delivers integrated onsite hardware/software support services available 24x7x365, including access to HP technical resources, 4-hour response onsite hardware support and software updates.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EEE>

##### 3-Year HP Proactive 24

As an alternative to our recommended support level, for customers who want enhanced operational effectiveness and proactive problem identification:

Provides improved stability, availability and operational effectiveness with an integrated hardware and software support service that combines industry-leading reactive technical assistance with proactive account services, giving your IT manage support from a team of service specialists.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-1614ENUC>

##### HP Proactive Select Service

Customer needs on demand access to consulting, technical proactive services and education courses

Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN>

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##### eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

##### Support Portal

The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

##### Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: <http://www.hp.com/support>



### Service and Support

HP Insight Remote Support software delivers secure remote support for your HP Servers and Storage, 24 X 7, so you can spend less time solving problems and more time focused on your business. You can have your systems remotely monitored for hardware failure using secure technology that's been proven at thousands of companies around the world. In many cases, you can avoid problems before they occur.

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#### Customer Technical Training

In today's cost-conscious business environment, IT professionals, developers, consultants and users face an interesting challenge: how to keep up with the latest technologies and expand important skills while delivering profitable results on current projects. To help address this challenge, HP offers innovative training solutions that help keep you up-to-date on virtualization, server, storage, Insight Control, Citrix, Microsoft® and open source/Linux-related topics-while spending less time away from business-critical activities.

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#### HP Services Awards

HP Technology Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction.

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#### Additional Services Information

To learn more on HP ProLiant servers, HP BladeSystem servers and HP StorageWorks storage products, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: [www.hp.com/services/proliant](http://www.hp.com/services/proliant) or [www.hp.com/services/bladeSystem](http://www.hp.com/services/bladeSystem) or <http://www.hp.com/hps/storage>



### Pre-configured Models

**NOTE:** For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.

**NOTE:** Pre-configured models ship with the configurations below. Options can be selected from the Core or Additional options section of this QuickSpecs.

**NOTE:** HP does not allow factory integration of options into pre-configured models. Any additional options purchased will be shipped separately.

**NOTE:** If you desire a custom configuration please see "Configuration Information - Factory Integrated Models" section of this QuickSpecs.

HP ML310G5p Q9400 1GB SATA 515866-001	Processor(s)	Quad-Core Intel® Core™2 processor Q9400 (2.66 GHz, 6MB L2 Cache, 95 Watts, 1333MHz FSB)
	Cache Memory	6MB L2
	Memory	1GB (1x1GB) UDIMM
	Network Controller	Embedded NC326i Dual Integrated Gigabit NICs
	Storage Controller	Embedded SATA with integrated SATA RAID 0, 1
	Hard Drives	None ship standard (Up to 4 hot plug SATA 3.5" drives supported standard. SAS 3.5" drives supported with optional HBA or controller)
	Internal Storage	SAS: 4.0TB maximum; SATA: 8.0TB maximum
	Optical Drive	SATA DVD-ROM Drive
	Power Supply	430W redundant power supply
	Fans	1 - Non-hot plug, Non-redundant system fans
	Form Factor	Tower (5U) (Optional Tower to Rack Enabling Kit available, system & tray occupy 6U)
	Warranty	Server Warranty includes 1-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response.

HP ML310G5p E8400 1GB SATA 515867-001	Processor(s)	Dual-Core Intel® Core™2 duo processor E8400 (3.00 GHz, 6MB L2 Cache, 65 Watts, 1333MHz FSB)
	Cache Memory	6MB L2
	Memory	1GB (1x1GB) UDIMM
	Network Controller	Embedded NC326i Dual Integrated Gigabit NICs
	Storage Controller	Embedded SATA with integrated SATA RAID 0, 1
	Hard Drives	None ship standard (Up to 4 hot plug SATA 3.5" drives supported standard. SAS 3.5" drives supported with optional HBA or controller)
	Internal Storage	SAS: 4.0TB maximum; SATA: 8.0TB maximum
	Optical Drive	SATA DVD-ROM Drive
	Power Supply	410W non-hot plug non-redundant power supply
	Fans	1 - Non-hot plug, Non-redundant system fans
	Form Factor	Tower (5U) (Optional Tower to Rack Enabling Kit available, system & tray occupy 6U)
	Warranty	Server Warranty includes 1-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response.



### Configuration Information - Factory Integrated Models

**NOTE:** This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for information on configurable product offerings and requirements.

**NOTE:** Configure-to-order (CTO) servers must start with a CTO Chassis.

**NOTE:** FIO indicates that this option is only available as a factory installable option.

#### Step 1: Base Configuration

HP Models	HP ProLiant ML310 G5p Configure-to-order Tower Chassis	445343-B22
	<b>Factory Integrated Models ship with:</b>	
	Embedded NC326i Gigabit Server Adapter	
	Integrated Four Port SATA Controller (HP-SATA/SAS chassis only)	
	Keyboard and Mouse	
	<b>NOTE:</b> The ML310G5p CTO chassis offers pluggable SATA/SAS Drives. It is required to purchase a Smart Array controller if hot plug function is needed.	

#### Step 2: Choose Required Options (only one of the following from each list unless otherwise noted)

HP Processors	Intel® Celeron 440 2.0GHz Single Core 35 Watts ML310 G5p Factory Integrated Processor Option Kit	519647-L21
	Intel® Xeon® E2160 1.80GHz Dual Core 65 Watts ML310 G5p Factory Integrated Processor Option Kit	519649-L21
	Intel® Xeon® E3120 3.16 GHz Dual Core 65 Watts ML310 G5p Factory Integrated Processor Option Kit	519651-L21
	Intel® Xeon® X3330 2.66GHz Quad Core 95 Watts ML310 G5p Factory Integrated Processor Option Kit	519655-L21
	Intel® Xeon® E8400 3.0GHz Dual Core 65 Watts ML310 G5p Factory Integrated Processor Option Kit	517494-L21
	Intel® Xeon® Q9400 2.66GHz Quad Core 95 Watts ML310 G5p Factory Integrated Processor Option Kit	517495-L21
	Intel® Xeon® E6400 2.13GHz Dual Core 65 Watts ML310 G5p Factory Integrated Processor Option Kit	519170-L21
	Intel® Xeon® E3110 3.0GHz Dual Core 65 Watts ML310 G5p Factory Integrated Kit	577026-L21
HP Memory	HP 2GB (1x2GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450260-B21
	HP 1GB (1x1GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450259-B21
HP Power Supplies	<b>NOTE:</b> Prior to making a power supply selection it is highly recommended that the HP Power Advisor is run to determine the right size power supply for your server configuration. The HP Power Advisor is located at: <a href="http://www.hp.com/go/hppoweradvisor">www.hp.com/go/hppoweradvisor</a>	
	430W Hot-plug Redundant Power Supply Kit, FIO	431652-B21
	<b>NOTE:</b> Hot plug redundant power supply Kit ships with two power supplies.	
	410W Non-hot-plug Power Supply, FIO	459902-B21
	<b>NOTE:</b> Non-hot plug power supply ships with one power supply.	

#### Step 3: Choose Additional Factory Integratable Options



### Configuration Information - Factory Integrated Models

#### HP Controllers

**NOTE:** When hot-plug SATA hard drives are installed, SATA LED functionality and full SATA hot-plug capability are not supported with the embedded controller. For full LED and hot-plug support, an optional SATA/SAS RAID controller must be installed. SAS Controllers support both SAS and SATA hard drives. Some SAS Controllers also have SAS tape support. Please refer to the "Tape and Disk-Based Backup" table in the Storage section for a list of SAS Controllers with tape support.

HP Smart Array E200/128 BBWC 2-ports Int PCIe x4 SAS Controller 411508-B21

**NOTE:** RAID 0, 1, 1+0, 5.

HP Smart Array P400/256 2-ports Int PCIe x8 SAS Controller 405132-B21

**NOTE:** RAID 0, 1, 1+0, 5.

HP Smart Array P400 512MB Battery Kit 411064-B21

**NOTE:** RAID 0, 1, 1+0, 5, 6.

HP Smart Array P800/512 BBWC 2-ports Int/2-ports Ext PCIe x8 SAS Controller 381513-B21

**NOTE:** RAID 0, 1, 1+0, 5, 6.

HP Smart Array P212/256 1-ports Int/1-ports Ext PCIe x8 SAS Controller 462834-B21

**NOTE:** RAID 0, 1, 1+0, 5, 5+0.

HP Smart Array P212/ZM 1-ports Int/1-ports Ext PCIe x8 SAS Controller 462828-B21

**NOTE:** RAID 0, 1, 1+0.

HP Smart Array P411/256 BBWC 2-ports Ext PCIe x8 FIO SAS Controller 491193-B21

**NOTE:** RAID 0, 1, 1+0, 5, 5+0.

HP Smart Array P411/256 2-ports Ext PCIe x8 SAS Controller 462830-B21

**NOTE:** RAID 0, 1, 1+0, 5, 5+0.

HP Smart Array P411/512 BBWC 2-ports Ext PCIe x8 SAS Controller 462832-B21

**NOTE:** RAID 0, 1, 1+0, 5, 5+0.

HP Smart Array P410/256 BBWC 2-ports Int PCIe x8 FIO SAS Controller 491195-B21

**NOTE:** RAID 0, 1, 1+0, 5, 5+0.

HP Smart Array P410/256 2-ports Int PCIe x8 SAS Controller 462862-B21

**NOTE:** RAID 0, 1, 1+0, 5, 5+0.

HP Smart Array P410/512 BBWC 2-ports Int PCIe x8 SAS Controller 462864-B21

**NOTE:** RAID 0, 1, 1+0, 5, 5+0.

HP Smart Array P410/ZM 2-ports Int PCIe x8 FIO SAS Controller 462860-B21

**NOTE:** RAID 0, 1, 1+0.

HP ML310 G5 SAS Cable 460310-B21

**NOTE:** This part number must be used with Smart Array E200 or SAS HBA for SAS models.

HP Mini SAS to 8484 18in/24in Cable Assembly 496015-B21

**NOTE:** This part number must be used with Smart Array P212/P411 Controller for SAS models.

#### SAS HBA

HP SC08Ge 2-ports Ext PCIe x8 SAS Host Bus Adapter 488765-B21

HP Modular Smart Array SC44Ge 1-ports Int/1-ports Ext PCIe x8 SAS Host Bus Adapter 416096-B21

**NOTE:** RAID 0, 1.

**NOTE:** When using the SC44Ge with SATA Hard Drives, 1.5G SATA Hard Drives are required. Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.



Configuration Information - Factory Integrated Models

	HP 64/133 2-ports Int PCI-X SAS Host Bus Adapter	347786-B21
	<b>NOTE:</b> When using the 8 Internal Port SAS HBA with SATA Hard Drives, 1.5G SATA Hard Drives are required.	
	<b>NOTE:</b> Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.	
HP Insight Software	HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Single Server FIO License	582765-B21

Step 4: Choose Additional Options for Factory Integration

**NOTE:** For additional options, please refer to the "Core Options" and "Additional Options" section below.





### Core Options

**NOTE:** Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

HP Memory	HP 2GB (1x2GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450260-B21
	HP 1GB (1x1GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450259-B21

HP Floppy Drives	1.44MB Diskette Drive Option Kit	379257-B21
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HP Optical Drives	HP Half-Height SATA DVD-ROM Optical Drive	447326-B21
	HP Half-Height SATA DVD RW Optical Drive	447328-B21

### HP Hard Drives

**NOTE:** The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

**NOTE:** Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

**NOTE:** A HP Smart Array Controller is required for hot plug functionality.

#### SAS Hot Plug LFF (3.5-inch) Enterprise (ENT) Drives

HP 600GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516828-B21
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HP 450GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516816-B21
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HP 300GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516814-B21
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#### SAS Hot Plug LFF (3.5-inch) Midline (MDL) Drives

HP 1TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507614-B21
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**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information:

[http://h18000.www1.hp.com/products/quickspecs/12244\\_na/12244\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html)

#### SATA Hot Plug LFF (3.5-inch) Midline (MDL) Drives

HP 2TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	507632-B21
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HP 1TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	454146-B21
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HP 500GB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	458928-B21
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#### SATA Hot Plug LFF (3.5-inch) Entry (ETY) Drives

HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive	571230-B21
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HP 160GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive	458945-B21
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**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information:

[http://h18000.www1.hp.com/products/quickspecs/13021\\_na/13021\\_na.html](http://h18000.www1.hp.com/products/quickspecs/13021_na/13021_na.html)

#### SATA Hot Plug 3.5" Midline (MDL) Solid State Drives

HP 60GB 3G SATA LFF (3.5-inch) Midline 1yr Warranty Solid State Drive	570761-B21
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HP 120GB 3G SATA LFF (3.5-inch) Midline 1yr Warranty Solid State Drive	570763-B21
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### Core Options

**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information:

[http://h18000.www1.hp.com/products/quickspecs/13415\\_na/13415\\_na.html](http://h18000.www1.hp.com/products/quickspecs/13415_na/13415_na.html)

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#### HP Networking

##### Gigabit Ethernet Adapters

HP NC365T 4-port Ethernet Server Adapter 593722-B21

HP NC375T PCI Express Quad Port Gigabit Server Adapter 538696-B21

**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: [www.hp.com/go/ProLiantNICs](http://www.hp.com/go/ProLiantNICs)

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#### HP I/O Expansion Options

HP ML310 G5p PCI-X Extender Board Kit 451778-B21

**NOTE:** An additional fan is required with PCI-X Extender Board. This fan is included in the HP ML310 G5p PCI-X Extender Board Kit.

HP ProLiant Second Serial / Parallel port option kit 401222-B21



### Additional Options

**NOTE:** Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

<b>HP Insight Software</b>	
<b>HP Insight Control</b>	
HP Insight Control including 1yr 24x7 Technical Support and Updates Electronic License	T9074BAE
HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Electronic License	TC278AAE
HP Insight Control including 1yr 24x7 Technical Support and Updates Single Server License	452148-B22
HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Tracking License	TC275A
HP Insight Software Media Kit	436222-B21
<p><b>NOTE:</b> Insight Software DVD media without licenses. Contains HP Systems Insight Manager, HP Insight Control, HP Insight Dynamics, HP Insight Control for Microsoft System Center, and Virtual Connect Enterprise Manager software. Uses an integrated installer to perform quick and accurate software installation and updates.</p> <p><b>NOTE:</b> Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single activation key.</p> <p><b>NOTE:</b> Customer will receive a license entitlement certificate. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service.</p> <p><b>NOTE:</b> Licenses ship without media. The HP Insight Control Media Kit can be ordered separately, or can be downloaded at: <a href="http://www.hp.com/go/insightupdates">http://www.hp.com/go/insightupdates</a>.</p> <p><b>NOTE:</b> For additional license options please see the Insight Control QuickSpecs at: <a href="http://h18000.www1.hp.com/products/quickspecs/12631_na/12631_na.html">http://h18000.www1.hp.com/products/quickspecs/12631_na/12631_na.html</a></p>	
<b>HP Insight Control for Linux</b>	
HP Insight Control for Linux including 1yr 24x7 Support Electronic License	TC213AAE
HP Insight Control for Linux including 1yr 24x7 Support Single Server License	TC209A
HP Insight Control for Linux Media Kit	TC208A
<p><b>NOTE:</b> Media pack DVD contains the ISO image for HP Insight Control for Linux, HP Systems Insight Manager, HP Insight Control power management, HP Insight Control virtual machine management, and an integrated installer. Servers must be acquired separately.</p> <p><b>NOTE:</b> Licenses ship without media. The Media Kit for Insight Control for Linux can be ordered separately, or can be downloaded at: <a href="http://www.hp.com/go/ic-linux">http://www.hp.com/go/ic-linux</a> (click on Download button).</p> <p><b>NOTE:</b> Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single set of activation keys.</p> <p><b>NOTE:</b> For additional License Kits, including electronic licensing options, please see the QuickSpecs at: <a href="http://h18000.www1.hp.com/products/quickspecs/13019_na/13019_na.html">http://h18000.www1.hp.com/products/quickspecs/13019_na/13019_na.html</a></p>	
<b>HP Integrated Lights-Out (iLO) Advanced</b>	
HP iLO Advanced including 1yr 24x7 Technical Support and Updates Electronic License	TA850AAE
HP iLO Advanced including 1yr 24x7 Technical Support and Updates Single Server License	512485-B21



### Additional Options

**NOTE:** This license allows 1 server to be deployed and managed via HP iLO Advanced. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service

**NOTE:** For additional license kits, including electronic delivery options, please see the QuickSpecs at:

[http://h18000.www1.hp.com/products/quickspecs/12362\\_na/12362\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12362_na/12362_na.html)

#### HP Security - TPM

##### HP Trusted Platform Module Option Kit

488069-B21

**NOTE:** The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline. For more information about TPM, including a white paper, go to:

[www.hp.com/go/TPM](http://www.hp.com/go/TPM).

**NOTE:** ProLiant OS pre-installed units will come with the partition required for TPM deployment.

**NOTE:** The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.

#### HP Storage Controllers

##### SAS Cable

**NOTE:** A SAS HBA or Controller is required if SAS hard drives are selected. SAS HBAs support both SAS and SATA hard drives. Some SAS HBAs also have SAS tape support. Please refer to the "Tape and Disk-Based Backup" table in the Storage section for a list of SAS HBAs with tape support.

##### SAS Controllers

**NOTE:** Any Smart Array Controller or SAS HBA requires the purchase of the HP SAS Cable (p/n 460310-B21) for the ML310 G5p. Smart Array P212/P410/P411 Controller for SAS models require the purchase of the HP mini SAS Cable (p/n 496015-B21) for the ML310 G5p.

##### Smart Array E200 Controller

HP Smart Array E200/128 BBWC 2-ports Int PCIe x4 SAS Controller

411508-B21

##### Smart Array P400 Controller

HP Smart Array P400/256 2-ports Int PCIe x8 SAS Controller

405132-B21

HP Smart Array P400 512MB Battery Kit

411064-B21

##### Smart Array P800 Controller

HP Smart Array P800/512 BBWC 2-ports Int/2-ports Ext PCIe x8 SAS Controller

381513-B21

##### Smart Array P212 Controller

HP Smart Array P212/ZM 1-ports Int/1-ports Ext PCIe x8 SAS Controller

462828-B21

HP Smart Array P212/256 1-ports Int/1-ports Ext PCIe x8 SAS Controller

462834-B21

##### Smart Array P410 Controller

HP Smart Array P410/256 2-ports Int PCIe x8 SAS Controller

462862-B21



### Additional Options

HP Smart Array P410/512 BBWC 2-ports Int PCIe x8 SAS Controller	462864-B21
HP Smart Array P410/512 FBWC 2-ports Int PCIe x8 SAS Controller	578230-B21
HP Smart Array P410/1G FBWC 2-ports Int PCIe x8 SAS Controller	572532-B21
<b>Smart Array P411 Controller</b>	
HP Smart Array P411/256 2-ports Ext PCIe x8 SAS Controller	462830-B21
HP Smart Array P411/512 BBWC 2-ports Ext PCIe x8 SAS Controller	462832-B21
HP Smart Array P411/512 FBWC 2-ports Ext PCIe x8 SAS Controller	578229-B21
HP Smart Array P411/1G FBWC 2-ports Ext PCIe x8 SAS Controller	572531-B21
<b>Smart Array P812 Controller</b>	
HP Smart Array P812/1G FBWC 2-ports Int/4-ports Ext PCIe x8 SAS Controller	487204-B21
<b>Optional Upgrades</b>	
HP Smart Array P400 Battery Attach Kit	417836-B21
<b>NOTE:</b> This option kit contains a 24" battery cable and adhesive material for installing a batter into the server if a Smart Array E500 is integrated outside of the factory. For all solutions, please refer to the server QuickSpecs and User's Manual for detailed installation instructions.	
HP Smart Array Cache Battery Kit	383280-B21
<b>NOTE:</b> For Smart Array P400 Controller only.	
HP 512MB w/Battery Smart Array Battery Back Write Cache Enabler	405148-B21
<b>NOTE:</b> For Smart Array P400 Controller only.	
HP 256MB P-series Cache Upgrade	462968-B21
<b>NOTE:</b> Supported on HP Smart Array P212 Controller only.	
HP 512MB P-Series Battery Backed Write Cache Upgrade	462967-B21
<b>NOTE:</b> Supported on HP Smart Array P410 Controller and HP Smart Array P411 Controller only.	
HP 512MB Flash Backed Write Cache	534916-B21
HP 1GB Flash Backed Cache	534562-B21
HP Mini SAS to 8484 18in/24in Cable Assembly	496015-B21
<b>NOTE:</b> This part number must be used with Smart Array P212/P411 Controller for SAS models.	
HP Smart Array Advanced Pack including 1yr 24x7 Technical Support and Updates Single Server License	516471-B21
<b>NOTE:</b> This part number can be used to purchase a single license or to order multiple licenses with a single activation key. Customers will receive a license entitlement certificate via e-mail. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Include one year of 24x7 HP Software Technical Support Services.	
<b>NOTE:</b> Please see the following QuickSpecs for Technical Specifications and additional information:	
<a href="http://h18000.www1.hp.com/products/quickspecs/12460_na/12460_na.html">http://h18000.www1.hp.com/products/quickspecs/12460_na/12460_na.html</a> (Smart Array E200 Controller)	
<a href="http://h18000.www1.hp.com/products/quickspecs/12400_na/12400_na.html">http://h18000.www1.hp.com/products/quickspecs/12400_na/12400_na.html</a> (Smart Array P400 Controller)	
<a href="http://h18000.www1.hp.com/products/quickspecs/12616_na/12616_na.html">http://h18000.www1.hp.com/products/quickspecs/12616_na/12616_na.html</a> (Smart Array P800 Controller)	
<a href="http://h18000.www1.hp.com/products/quickspecs/13203_na/13203_na.html">http://h18000.www1.hp.com/products/quickspecs/13203_na/13203_na.html</a>	



### Additional Options

(Smart Array P212 Controller)

[http://h18000.www1.hp.com/products/quickspecs/13201\\_na/13201\\_na.html](http://h18000.www1.hp.com/products/quickspecs/13201_na/13201_na.html)

(Smart Array P410 Controller)

[http://h18000.www1.hp.com/products/quickspecs/13202\\_na/13202\\_na.html](http://h18000.www1.hp.com/products/quickspecs/13202_na/13202_na.html)

(Smart Array P411 Controller)

[http://h18000.www1.hp.com/products/quickspecs/13558\\_na/13558\\_na.html](http://h18000.www1.hp.com/products/quickspecs/13558_na/13558_na.html)

(Smart Array P812 Controller)

[http://h18000.www1.hp.com/products/quickspecs/13200\\_na/13200\\_na.html](http://h18000.www1.hp.com/products/quickspecs/13200_na/13200_na.html)

(Smart Array Advanced Pack)

#### SAS HBA

HP SC08Ge 2-ports Ext PCIe x8 SAS Host Bus Adapter

488765-B21

HP Modular Smart Array SC44Ge 1-ports Int/1-ports Ext PCIe x8 SAS Host Bus Adapter

416096-B21

**NOTE:** When using the SC44Ge with SATA Hard Drives, 1.5G SATA Hard Drives are required. Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.

HP 64/133 2-ports Int PCI-X SAS Host Bus Adapter

347786-B21

**NOTE:** When using the 8 Internal Port SAS HBA with SATA Hard Drives, 1.5G SATA Hard Drives are required.

**NOTE:** Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.

**NOTE:** Please see the HBA QuickSpecs for additional information:

[http://h18004.www1.hp.com/products/quickspecs/13082\\_na/13082\\_na.html](http://h18004.www1.hp.com/products/quickspecs/13082_na/13082_na.html)

(SC08Ge HBA)

[http://h18004.www1.hp.com/products/quickspecs/12617\\_na/12617\\_na.html](http://h18004.www1.hp.com/products/quickspecs/12617_na/12617_na.html)

(SC44Ge HBA)

[http://h18004.www1.hp.com/products/quickspecs/12332\\_na/12332\\_na.html](http://h18004.www1.hp.com/products/quickspecs/12332_na/12332_na.html)

(8 Internal Port SAS HBA)

#### SCSI HBA

HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter

412911-B21

**NOTE:** Recommended HBA for SCSI tape drive connect.

**NOTE:** If a Non-Hot Plug SCSI Tape Drive is selected in any model, then customer must add 412911-B21.

**NOTE:** Please see the following QuickSpecs for additional information:

[http://h18004.www1.hp.com/products/quickspecs/11943\\_na/11943\\_na.html](http://h18004.www1.hp.com/products/quickspecs/11943_na/11943_na.html)

(SCSI HBA)

[http://h18000.www1.hp.com/products/quickspecs/12566\\_na/12566\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12566_na/12566_na.html)

(SC11Xe HBA)



### Additional Options

#### HP Tape Backup

**NOTE:** For the complete range of StorageWorks tape drives, autoloaders, libraries and media see: <http://www.hp.com/go/tape>. For hardware and software compatibility of HP StorageWorks tape backup products see: <http://www.hp.com/go/connect>.

#### Rack-Mount Tape Solutions

HP StorageWorks 1/8 G2 LTO-4 Ultrium 1760 SAS Tape Autoloader	AK377A
<b>NOTE:</b> Requires HP 1U Tape Autoloader Rack Kit (AH166A) for rack installation.	
HP StorageWorks DAT 160 USB Internal Tape Drive	Q1580A
HP StorageWorks DAT 320 USB External Tape Drive	AJ823A
HP StorageWorks DAT 320 USB Internal Tape Drive	AJ825A
HP StorageWorks DAT 320 SAS External Tape Drive	AJ828A
HP StorageWorks DAT 320 SAS Internal Tape Drive	AJ830A
<b>NOTE:</b> Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks Ultrium 448 SAS Internal Drive	DW085A
<b>NOTE:</b> Connection using HP P212 Smart Array Controller SAS (462828-B21) recommended.	
HP StorageWorks 1/8 G2 Ultrium 920 SAS Autoloader	AH558A
<b>NOTE:</b> Requires HP 1U Tape Autoloader Rack-Mount Kit (AH166A) for rack installation. Connection using HP P212 Smart Array Controller SAS (462828-B21) recommended.	
HP StorageWorks LTO-4 Ultrium 1760 SAS Internal WW Tape Drive	EH919A
<b>NOTE:</b> Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks LTO-5 Ultrium 3000 SAS Internal Tape Drive	EH957A
<b>NOTE:</b> Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks MSL2024 0-Drive Tape Library	AK379A
HP StorageWorks MSL2024 1 LTO-4 Ultrium 1760 SAS Tape Library	AK378A
HP StorageWorks MSL2024 Ultrium 920 SAS Tape Library	AH559A
HP StorageWorks MSL4048 2 LTO-4 Ultrium 1760 SAS Tape Library	AK380A
HP StorageWorks MSL4048 0-Drive Tape Library	AK381A
HP StorageWorks MSL4048 Ultrium 920 SAS Tape Library	AH560A
HP StorageWorks MSL8048 0-drive Tape Library	AU300A
HP StorageWorks 1/8 G2 Tape Autoloader Rack Kit	AH166A
<b>NOTE:</b> Required to install the unit in a standard 19-inch rack; includes rails and rackmount instructions.	



### Additional Options

#### HP Disk Backup

**NOTE:** For the complete range of StorageWorks D2D Backup Systems see: <http://www.hp.com/go/d2d>. For the complete range of StorageWorks RDX drives and media see: <http://www.hp.com/go/rdx>. For hardware and software compatibility of HP StorageWorks disk backup products see: <http://www.hp.com/go/connect>.

##### HP StorageWorks RDX Removable Disk Backup Systems USB

HP StorageWorks RDX320 Internal Removable Disk Backup System

AJ767A

**NOTE:** For installation into 1U USB Rack-Mount Kit (A8007A). No peripheral bay available for drive installation into the server. 320GB of disk capacity per data cartridge.

HP RDX 1TB Int Removable Disk Backup Sys

BV847A

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#### HP StorageWorks Options StorageWorks SCSI HBA

HP StorageWorks U320e SCSI Dual Channel Host Bus Adapter

AH627A

**NOTE:** Recommended HBA for MSL SCSI Tape Library connect.

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#### HP Disk Storage Systems MSA SAN Storage Arrays

HP StorageWorks 60 Modular Smart Array

418408-B21

**NOTE:** Supports 12 SFF drives, and SAS 3 Gb/s and SATA 1.5 Gb/s.

**NOTE:** Please see the QuickSpecs for additional options and configuration information at:

[http://h18000.www1.hp.com/products/quickspecs/12627\\_na/12627\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12627_na/12627_na.html)

HP StorageWorks 70 Modular Smart Array

418800-B21

**NOTE:** Supports 25 SFF drives, and SAS 3 Gb/s and SATA 1.5 Gb/s.

**NOTE:** Please see the QuickSpecs for additional options and configuration information at:

[http://h18000.www1.hp.com/products/quickspecs/12652\\_na/12652\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12652_na/12652_na.html)

##### HP Disk Storage Systems

HP StorageWorks D2600 Disk Enclosure

AJ940A

**NOTE:** Please see the QuickSpecs for additional options and configuration information at:

[http://h18000.www1.hp.com/products/quickspecs/13404\\_na/13404\\_na.html](http://h18000.www1.hp.com/products/quickspecs/13404_na/13404_na.html)





### Additional Options

HP Uninterruptible Power Systems	HP Tower UPS	
	HP T750 G2 UPS	
	HP T750 G2 750VA Tower Uninterruptible Power System	AF446A
	HP T1000 G3 UPS Models	
	HP T1000 G3 1000VA Tower Uninterruptible Power System	AF448A
	HP T1500 G3 UPS Models	
	HP T1500 G3 1400VA Tower Uninterruptible Power System	AF450A
	<b>NOTE:</b> Please see the QuickSpecs for additional information: <a href="http://h18000.www1.hp.com/products/quickspecs/13160_na/13160_na.html">http://h18000.www1.hp.com/products/quickspecs/13160_na/13160_na.html</a>	
	<b>NOTE:</b> For additional information on HP Uninterruptible Power Systems please go to: <a href="http://www.hp.com/servers/rackups">www.hp.com/servers/rackups</a> .	
	<b>NOTE:</b> For additional information on sizing your server, please reference: <a href="http://www.upssizer.com">http://www.upssizer.com</a> .	
	<b>NOTE:</b> Please see the UPS and PDU cable matrix's on the HP Power Protection and Management page. Under Power Cords, click on the "HP Power Cord Matrix" link. That link will list cable descriptions, requirements, and specifications for UPS and PDU units. Please see the following link: <a href="http://www.hp.com/products/powercords">www.hp.com/products/powercords</a> .	

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HP Rack Options	Rack Kits	
	HP Tower to Rack Conversion Tray Universal Kit	417705-B21
	<b>NOTE:</b> This is a Rack Enabling Kit that supports the HP ProLiant ML110 and HP ProLiant ML310 servers (system & tray occupy 6U). <b>NOTE:</b> Support for racks with round or square mounting holes (including all Compaq and HP Rack System /E and HP Systems), with an adjustment range of 24" - 36".	

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HP USB and SD Options	HP 2GB USB Flash Media Drive Key	608447-B21
	<b>NOTE:</b> HP qualified blank USB key for use with HP ProLiant servers that support the VMware virtualization environment and other HP value-add software like SmartStart. HP recommends this industry standard USB flash device for use with VMware ESXi. USB device must be installed in the internal slot of the ProLiant server for use with VMware ESXi. Refer to <a href="#">HP VMware Getting Started Guide</a> for installation instructions.	

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### Additional Options

#### HP Care Pack Services

##### Hardware Services On-site Service

Next Business Day On-site Service, 5-Day x 9-Hour Coverage, 3 Years, Electronic	U4445E
4-Hour On-site Service, 5-Day x 13-Hour Coverage, 3 Years, Electronic	U4446E
4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic	U4447E
6-Hour Call to Repair, On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic	U4448E

##### Installation & Start-up Services

Hardware Installation, Electronic	U4456E
Installation & Start-Up of a ProLiant server and Microsoft or Linux O/S per the Customer Description and/or Data Sheet. To be delivered on a scheduled basis 8am-5pm, M-F, excl. HP holidays, Electronic	U4457E

##### Support Plus

Onsite HW support, 8am-9pm, M-F, 4hr response and Microsoft O/S SW Tech support offsite, onsite at HP's discretion, 8am-9pm, M-F 2hr response time excl. HP holidays, Electronic	U4458E
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##### Support Plus 24

Onsite HW support 24x7, 4hr response and Microsoft O/S SW Tech support offsite, onsite at HP's discretion, 24x7 2hr response time incl. HP holidays, Electronic	U4459E
Onsite HW support 24x7, 4hr response and SuSE Linux SW Tech support offsite, onsite at HP's discretion, 24x7 2hr response time incl. HP holidays, Electronic	U6306E

**NOTE:** For more information, customer/resellers can contact:  
<http://www.hp.com/services/carepack>.



### Memory

**NOTE:** Memory configurations listed do not apply to "Factory Integrated Models".

#### HP ProLiant ML310 G5p Memory Configuration

##### Standard Memory

All HP ProLiant ML310 G5p models ship with unbuffered, ECC PC2-6400 DDR2 SDRAM running at 800MHz.

All models include a single 1GB DIMM.

Factory Integrated Models include the memory capacity of your choice.

##### Standard Memory Replaced with Optional Memory

Up to 8 GB memory is available with the optional installation of four 2 GB PC2-6400 Unbuffered ECC DDR2 SDRAM DIMM kits.

DIMM upgrades do not need to be installed in pairs although installation of pairs (an equal size DIMM for each channel) provides the best performance. The BIOS will detect the DIMM population and initialize the system accordingly as follows:

- Single-channel mode - DIMMs installed for one channel only
- Dual-channel asymmetric mode - DIMMs installed for both channels but of unequal channel capacities.
- Dual-channel interleaved mode (recommended) - DIMMs installed for both channels and offering equal channel capacities, providing the highest performance.

The first DIMM should be installed in Socket 1. A DIMM should not be installed in Socket 2 without a DIMM in Socket 1. Likewise a DIMM should not be installed in Socket 4 without a DIMM in Socket 3. A DIMM need not be installed in Socket 2 in order to install a DIMM in Socket 3.

Table 3-1 shows some of the suggested memory configurations for these systems.

**NOTE:** Table 3-1 does not list all possible configurations. Balanced-capacity, dual-channel loading yields best performance.

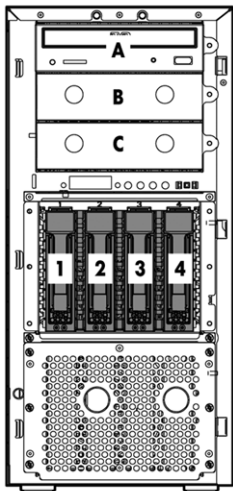
Channel A		Channel B		Total	Mode
Socket 1	Socket 2	Socket 3	Socket 4		
512 MB	none	none	none	512 MB	Single-channel
512 MB	none	512 MB	none	1 GB	Single-channel interleaved
1 GB	none	none	none	1 GB	Single-channel
1 GB	none	1 GB	none	2 GB	Single-channel interleaved
1 GB	1 GB	1 GB	none	3 GB	Dual-channel asymmetric
1 GB	1 GB	1 GB	1 GB	4 GB	Dual-channel interleaved
1 GB	2 GB	1 GB	2 GB	6 GB	Dual-channel interleaved
2 GB	2 GB	2 GB	2 GB	8 GB	Dual-channel interleaved

Following are memory options available from HP:

HP Memory	HP 2GB (1x2GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450260-B21
	HP 1GB (1x1GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450259-B21



Storage



B, C    Removable Media Bays (1.6" each)

A    SATA DVD-ROM

1 - 4    Four Hot Plug Hard Drive Bays

Drive Support

	Quantity Supported	Position Supported	Controller
Removable Media			
1.44-MB Diskette Drive	Up to 1	A, B, or C	Integrated
HP Half-Height SATA DVD-ROM Optical Drive	Up to 2	A, B, or C	Integrated SATA
HP Half-Height SATA DVD RW Optical Drive	Up to 2	A, B, or C	Integrated SATA

Hard Drives

**NOTE:** The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

**NOTE:** Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

SAS Hot Plug LFF (3.5-inch) Enterprise (ENT) Drives

	Quantity Supported	Position Supported	Controller
600GB 6G SAS 15K DP	Up to 4	1-4	HP SC40Ge SAS HBA with RAID 0, 1
450GB 6G SAS 15K DP			<b>NOTE:</b> When using the SC40Ge with SATA Hard Drives, 1.5G SATA Hard Drives are required. Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.
300GB 6G SAS 15K DP			HP 8 Internal Port SAS HBA with RAID
			<b>NOTE:</b> Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.
			HP Smart Array P212 0 MB Controller
			HP Smart Array E200/128 BBWC Controller
			HP Smart Array P212/256 MB Controller
			HP Smart Array P400/256 MB Controller
			HP Smart Array P410/256 MB Controller
			HP Smart Array P400/512 MB BBWC Controller
			HP Smart Array P800/512 BBWC Controller



### Storage

**NOTE:** Use of SAS hard drives in SATA/SAS models requires installation of one of the controllers or HBAs listed above.

#### SAS Hot Plug LFF (3.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
1TB 6G SAS 7.2K DP	Up to 4	1-4	HP SC40Ge SAS HBA with RAID <b>NOTE:</b> When using the SC40Ge with SATA Hard Drives, 1.5G SATA Hard Drives are required. Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS. HP 8 Internal Port SAS HBA with RAID <b>NOTE:</b> Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS. HP Smart Array E200/128 BBWC Controller HP Smart Array P400/256 MB Controller HP Smart Array P400/512 MB BBWC Controller HP Smart Array P800/512 BBWC Controller HP Smart Array P212/Zero Memory Controller HP Smart Array P212/256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller

**NOTE:** Use of SAS hard drives in SATA/SAS models requires installation of one of the controllers or HBAs listed above.

#### SATA Hot Plug LFF (3.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
2TB 3G SATA 7.2K	Up to 2	1-2	HP Smart Array E200/128 BBWC Controller
1TB 3G SATA 7.2K	Up to 4	1-4	HP Smart Array P400/256MB Controller
500GB 3G SATA 7.2K	<b>NOTE:</b> depending on model.	<b>NOTE:</b> depending on model.	HP Smart Array P400/512MB BBWC Controller HP Smart Array P800/512MB BBWC Controller HP Smart Array P212/Zero Memory Controller HP Smart Array P212/256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller

**NOTE:** Hot plug capability and drive LED status support requires installation of one of the controllers or HBAs listed above.

#### SATA Hot Plug 3.5" Midline (MDL) Solid State Drives

	Quantity Supported	Position Supported	Controller
60GB 3.0G SATA SSD	Up to 4	1-4	HP Smart Array P212/Zero Memory Controller
120GB 3.0G SATA SSD			HP Smart Array P212/256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller



### Storage

#### External Storage

	Quantity Supported	Position Supported	Controller
60 Modular Smart Array	Up to 8	External	HP Smart Array P800/512 BBWC Controller
	Up to 8	External	HP Smart Array P212/Zero Memory Controller
	Up to 4	External	HP Smart Array P212/256 MB Controller
			HP Smart Array P411/256 MB Controller
			HP Smart Array P411/512 MB BBWC Controller
70 Modular Smart Array	Up to 4	External	HP Smart Array P800/512 BBWC Controller
	Up to 4	External	HP Smart Array P212/Zero Memory Controller
	Up to 2	External	HP Smart Array P212/ 256 MB Controller
			HP Smart Array P411/256 MB Controller
			HP Smart Array P411/512 MB BBWC Controller

#### Tape and Disk Backup

**NOTE:** For the complete range of StorageWorks tape drives, autoloaders, libraries and media, including the internal fitting models, see: <http://www.hp.com/go/tape>. For the complete range of StorageWorks D2D Backup Systems see: <http://www.hp.com/go/d2d>. For the complete range of StorageWorks RDX drives and media see: <http://www.hp.com/go/rdx>. For hardware and software compatibility of HP StorageWorks disk and tape backup products see: <http://www.hp.com/go/connect>.

	Position Supported	Controller	Part Number
<b>HP StorageWorks SCSI Tape Drives</b>	Internal or External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
LTO-1 Ultrium 232			
LTO-2 Ultrium 448			
LTO-3 Ultrium 920			
LTO-3 Ultrium 960			
LTO4 Ultrium 1760			
LTO-4 Ultrium 1840			
DAT 40			
DAT 72			
DAT 160			
<b>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>			
<b>HP StorageWorks SCSI Rack Mount Kits</b>	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
1U Rack-Mount Kit			
3U Rack-Mount Kit			
<b>HP StorageWorks USB Tape Drives</b>	Internal or External	USB 2.0 Port	N/A
DAT 40			
DAT 72			
DAT 160			
DAT 320			



### Storage

<b>HP StorageWorks USB Rack Mount Kits</b> 1U USB Rack-Mount Kit	External	USB 2.0 Port	N/A
<b>HP StorageWorks SAS Tape Drives</b> DAT 160 DAT 320 LTO-2 Ultrium 448 LTO-3 Ultrium 920 LTO-4 Ultrium 1760 LTO-4 Ultrium 1840 LTO-5 Ultrium 3000 LTO-5 Ultrium 3280	Internal or External	HP Modular Smart Array SC44Ge 1-ports Int/1-ports Ext PCIe x8 SAS Host Bus Adapter  <b>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	416096-B21
<b>HP StorageWorks SAS Rack Mount Kits</b> 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP Modular Smart Array SC44Ge 1-ports Int/1-ports Ext PCIe x8 SAS Host Bus Adapter  <b>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	416096-B21
<b>HP StorageWorks SCSI Tape Autoloaders</b> DAT 72x10 Autoloader 1/8 G2 Autoloader	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter  <b>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	412911-B21
<b>HP StorageWorks SCSI Tape Libraries</b> MSL2024 MSL4048 MSL8096 MSL6000	External	HP StorageWorks U320e SCSI Dual Channel Host Bus Adapter  <b>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	AH627A
<b>HP StorageWorks SAS Tape Autoloaders and Libraries</b> 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096	External	HP Modular Smart Array SC44Ge 1-ports Int/1-ports Ext PCIe x8 SAS Host Bus Adapter  <b>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	416096-B21
<b>HP StorageWorks Fibre Channel Tape Libraries</b> MSL2024 MSL4048 MSL8096 MSL6000	External	Please consult the EBS connectivity matrix at: <a href="http://www.hp.com/go/ebs">http://www.hp.com/go/ebs</a> for connectivity information and the supported Fibre Channel HBAs shown in this QuickSpecs.	



### Storage

HP StorageWorks USB RDX Removable Disk Backup System RDX160 RDX320 RDX500 RDX750	Internal or External	USB 2.0 Port	N/A
HP StorageWorks D2D Backup Systems, iSCSI D2D2500i D2D4000i	External	Embedded Network Controller. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.	
HP StorageWorks D2D Backup Systems, Fibre Channel D2D4000fc	External	Direct server attach is not supported, requires connection via SAN fabric. See: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	





### Technical Specifications

System Unit	Dimensions (H x W x D) (with bezel)	17.0 x 7.9 x 24.0 in (43.2 x 20.0 x 61.0 cm)	
	Tower Weight (approximate)	Maximum (two hard drives, power supply, and processor installed)	50 lb (22.7 kg)
		Minimum (one hard drive, power supply, and processor installed)	33.1 lb (15.0 kg)
Input Requirements (per power supply)	Input Requirements (per power supply)	Rated Line Voltage	90 VAC - 264 VAC
		Rated Input Current	6.5 A (at 100 VAC), 3 A (at 230 VAC)
		Rated Input Frequency	47 to 63 Hz
		Rated Input Power	<527W @115/230 VRMS
BTU Rating		Maximum	1836 BTU/hr (at 100 VAC), 1706 BTU/hr (at 200 VAC)
Power Specifications	<p><b>NOTE:</b> To review typical system power ratings use the HP Power Advisor which is available online located at url: <a href="http://www.hp.com/go/proliant-energy-efficient">www.hp.com/go/proliant-energy-efficient</a> or <a href="http://www.hp.com/go/hppoweradvisor">www.hp.com/go/hppoweradvisor</a></p> <p>- Click on the system of interest. Example: ML310 G5p</p> <p>- Follow the instructions of the next screens.</p>		
Power Supply Output (per power supply)	Power Supply Output (per power supply)	Rated Steady-State Power	400 W (at 100 VAC), 400 W (at 200 VAC)
		Maximum Peak Power	400 W (at 100 VAC), 400 W (at 200 VAC)
System Inlet Temperature	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).	
	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).	
Relative Humidity (non-condensing)	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.	
	Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.	
Altitude	Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed.	



Technical Specifications

		Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
	Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
Acoustic Noise	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).	
	Idle	
	L WAd (BELS)	5.0 B
	L pAm (dBA)	32 dBA
	Operating	
	L WAd (BELS)	5.0 B
	L pAm (dBA)	32 dBA
Emissions Classification (EMC)	FCC Rating	B
	Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1
<b>NOTE:</b> Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.		

HP SATA DVD-ROM Optical Drive	Applicable Disk	DVD-ROM DVD-R /-RW (Read Only) DVD+R /+RW (Read Only) 2.6 GB/side DVD-RAM (Read Only) 5.2 GB/side DVD-RAM (Read Only) CD-ROM Mode-1 data disc CD-ROM Mode-2 data disc CD Audio disc CD-Extra CD-RW (Read Only) CD-R (Read Only) CD Text PhotoCD CD-I (mode 2) CD-I Ready CD-Bridge		
	Capacity	DVD-ROM	DVD-SL DVD-DL Double Sided	4.7 GB/side 8.5 GB/side 9.40 GB/side

### Technical Specifications

	DVD-R/-RW	4.7 GB/side
	DVD-RAM	2.6 GB/5.2 GB/side
	DVD+R/+RW	4.7 GB
	CD-ROM	Mode-1 650 (700 MB)
		Mode-2 742 MB (640 MB)
Block Size	DVD	2,048 bytes
	CD	2,352 (Mode-0)
		2352, 2340, 2336, 2048 bytes (Mode-1)
		2352, 2340, 2336, 2048 bytes (Mode-2)
Diameter	120 mm, 80 mm (with adapter at vertical mounting mode)	
Loading Mechanism	Tray type Auto Loading	
Interface	SATA 1.5	
Access Times (typical)	Random	DVD-ROM < 140 ms, CD-ROM < 125 ms
	Full-Stroke	DVD-ROM < 250 ms, CD-ROM < 210 ms
Data Transfer Rate (sustained)	DVD-ROM	21.6 MB/sec. Max.
	CD-ROM	6 MB/sec. Max.
Cache Buffer	2 MB	
Spin-up Time (typical)	less than 10 seconds	
MTBF	125,000 Power On Hours (POH)	
Ambient Temperature	Operating	41° to 122° F (5° to 50° C)
	Storage/Transportation	-40° to 120° F (-40° to 60° C)
Relative Humidity	Operating	10% to 90%
	Storage/Transportation	5% to 95%
Drive Dimensions (HxWxD, maximum)	1.62 x 5.75 x 7.87 in (41.3 x 146 x 200 mm)	

#### HP SC40Ge SAS Host Bus Adapter with RAID

RAID Support	RAID 1 (Mirroring) RAID 0 (Striping)
Logical Drives Supported	Up to 2 Logical Volumes Up to 10 drives total in all RAID volumes Up to 2 Drives per RAID 1 Up to 8 Drives per RAID 0
Maximum Capacity	4TB (4 x 1TB)
Data Transfer Method	64-bit wide, PCIe 133 MHz (1 GB/s maximum bandwidth)
Port Transfer Rate	12 Gb/s per x4 Wide SAS Port (4 x 3 Gb/s)
Simultaneous Drive Transfer Ports	2 x4 Wide SAS Connectors
Protocols	3 Gbps SAS (Serial Attached SCSI) 1.5 Gbps SATA (Serial Advanced Technology Attachment)
External SAS Connectors	None
Internal SAS Connectors	2 internal SFF8484 x4 SAS Connectors



### Technical Specifications

Upgradeable Firmware    4MB flashable ROM

Embedded NC326i Gigabit Server Adapter	Network Interface	10Base-T/100Base-TX/1000Base-TX	
	Compatibility	IEEE 802.3 10Base-T	
		IEEE 802.3ab 1000Base-T	
		IEEE 802.3u 100Base-TX	
	Data Transfer Method	Four lane (x4), 100MHz PCI Express Reference Clock	
	Controller	BCM5715C	
	Network Transfer Rate	10Base-T (Half-Duplex)	10 Mb/s
		10Base-T (Full-Duplex)	20 Mb/s
		100Base-TX (Half-Duplex)	100 Mb/s
		100Base-TX (Full-Duplex)	200 Mb/s
		1000Base-TX (Half and Full-Duplex)	2000Mb/s
	Connector	RJ-45	
	Cable Support	10Base-T	Categories 3, 4 or 5 UTP; up to 328 ft (100 m)
		10/100/1000Base-TX	Category 5 UTP; up to 328 ft (100 m)

HP Integrated Lights-Out 2 (iLO 2) integrated on system board	Architecture	32-bit PCI-based health and remote management ASIC	
	Processor	32-bit RISC processor core running at 66MHz	
	Upgradeability	Option firmware upgradeable via Flash ROM	
	Operating System Support	Microsoft Windows Server 2008 Standard Edition (32bit and 64bit)	
		Microsoft Windows Server 2008 Enterprise Edition (32bit and 64bit)	
		Microsoft Windows Server 2003 and Windows Server 2003 R2, and Windows Server 2003 for Extended Systems Standard Edition, Enterprise Edition	
		Red Hat Enterprise Linux 5.4 (32bit and 64bit)	
		SUSE LINUX Enterprise Server 11 (32bit and 64bit)	
		SUSE LINUX Enterprise Server 10 (32bit and 64bit)	
		VMware ESX 4.0	
		VMware ESX 3.5.0	
		Microsoft Windows XP Professional Edition	
		Microsoft Windows Vista Business and Ultimate Editions	
	Client Browser Support	Red Hat Enterprise Linux Desktop 5.00	
		SUSE Linux Enterprise Desktop 11	
		SUSE Linux Enterprise Desktop 10	
		Microsoft Internet Explorer 7	
		Microsoft Internet Explorer 6	
		Firefox 3.5 (on supported Windows and Linux systems)	
		Firefox 3.0 (on supported Windows and Linux systems)	



### Technical Specifications

<b>Command Line Support</b>	Telnet, Secure Shell and serial port access Secure Socket Layer Secure Shell version 2 (Password and certificate)
<b>Security</b>	Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface RC4 encryption of video
<b>Directory Support Services</b>	Active Directory v1.0 (Windows 2003)
<b>Driver Support</b>	Health Driver (HP ProLiant iLO 2 Management Controller Driver) iLO Management Channel Interface Driver
<b>Management protocols supported</b>	SNMP 2, IPMI 2.0 (KCS interface), DMTF Server Management Command Line Protocol Specification (SM CLP), DMTF Web Services Management Specification (WS Management)

<b>Environment-friendly Products and Approach</b>	<b>End-of-life Management and Recycling</b>	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> . To recycle your product, please go to: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
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The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.

